

WHAT IS CLAIMED IS:

1. A light treatment apparatus comprising:

a casing;

5 a light source disposed in said casing for generating a predetermined number of light pulses of a predetermined duration, light intensity, and total energy;

an applicator element mounted to said casing in optical communication with said light source for directing light from said source to a target;

10 at least one signal generator for generating and transmitting, to a sensor, at least one trigger signal prior to the generating of said light pulses by said light source; and

a control unit operatively connected to said light source and said signal generator for synchronizing the operation thereof.

2. The apparatus defined in claim 1 wherein said light pulses are primary light pulses of
15 a first predetermined duration, a predetermined first light intensity and said total energy, said signal generator is a preliminary light generator, and said trigger signal is a preliminary light pulse of a predetermined second duration and a second light intensity, said second light intensity being less than said first light intensity and sufficiently low so that said preliminary light pulse poses no substantial risk of damage to retinal receptors.

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3. The apparatus defined in claim 2 wherein said preliminary light pulse has a sufficient intensity to activate a light limiting reaction in light-limiting optical material prior to the generating of said primary light pulses.

4. The apparatus defined in claim 3 wherein said light source is a primary light source, said preliminary light generator including a secondary light source different from said primary light source.

5 5. The apparatus defined in claim 4 wherein said secondary light source includes a light emitting diode.

6. The apparatus defined in claim 3 wherein the light-limiting reaction of said optical material has a predetermined delay or lag time from an initial impingement of light on said
10 sensor to a point where the optical material is sufficient darkened to effectively block light transmission, said preliminary light pulse beginning prior to said primary light pulses by a time at least equal to said delay or lag time.

7. The apparatus defined in claim 6 wherein said preliminary light pulse begins at least
15 one-tenth of a millisecond prior to said primary light pulses.

8. The apparatus defined in claim 3 wherein said light-limiting optical material is in protective eyewear.

20 9. The apparatus defined in claim 8 wherein said sensor is different from the said light-limiting optical material.

10. The apparatus defined in claim 8 wherein said sensor is said light-limiting optical material.

11. The apparatus defined in claim 2 wherein said light pulses are greater than one in number and have at least one predetermined inter-pulse interval.

5 12. The apparatus defined in claim 11 wherein said preliminary light pulse is one of a plurality of preliminary light pulses produced by said preliminary light generator, each of said preliminary light pulses beginning prior to a respective one of said primary light pulses.

10 13. The apparatus defined in claim 12 wherein said preliminary light pulse has a sufficient intensity to activate a light limiting reaction in light-limiting optical material prior to the generating of said primary light pulses, the light-limiting reaction of said optical material having a predetermined delay or lag time from an initial impingement of light on said sensor to a point where the material is sufficient darkened to effectively block light transmission, each of said preliminary light pulses beginning prior to the respective one of said primary light pulses by
15 a time at least equal to said delay or lag time.

14. The apparatus defined in claim 2 wherein said preliminary light pulse is of incoherent light energy.

20 15. The apparatus defined in claim 1 wherein said trigger signal is transmitted wirelessly to said sensor.

16. The apparatus defined in claim 15, further comprising a wireless transmitter operatively connected to said signal generator.

17. The apparatus defined in claim 15 wherein said trigger signal is a light signal, said sensor being a photodetector.

5 18. The apparatus defined in claim 1 wherein said light pulses are of incoherent light energy.

19. A light treatment method comprising:
generating a predetermined number of light pulses of a predetermined duration, light
10 intensity, and total energy;
directing said light pulses to a target;
automatically generating at least one trigger signal prior to the generating of said primary light pulses;
transmitting said trigger signal to a sensor prior to the generating of said primary light
15 pulses; and
in response to a receipt of said trigger signal by said sensor, automatically generating a light limiting reaction in a generally transparent light-limiting optical material, thereby preventing transmission of said light pulses through said generally transparent material.

20 20. The method defined in claim 19 wherein said light pulses are primary light pulses of a predetermined first duration, first light intensity, and said total energy, said trigger signal being at least one preliminary light pulse of a predetermined second duration and second light intensity, said second light intensity being less than said first light intensity and sufficiently low so that said preliminary light pulse poses no substantial risk of damage to retinal receptors.

21. The method defined in claim 20 wherein said preliminary light pulse has a sufficient intensity to trigger said light limiting reaction in said light-limiting optical material prior to the generating of said primary light pulses.

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22. The method defined in claim 21 wherein the preliminary light pulse acts directly on said light-limiting optical material to activate a darkening reaction therein.

23. The method defined in claim 21 wherein a sensor different from said light-limiting
10 optical material is responsive to said preliminary light pulse and acts on said light-limiting optical material to activate a darkening reaction therein.

24. The method defined in claim 20 wherein the generating of said primary light pulses includes operating a first light source and the generating of said preliminary light pulse includes
15 operating a second light source different from said first light source.

25. The method defined in claim 20 wherein said preliminary light pulse begins at least one-tenth of a millisecond prior to said primary light pulses.

20 26. The method defined in claim 20 wherein the directing of said primary light pulses to said target includes directing said light pulses in a first direction, further comprising directing said preliminary light pulse in at least one second direction different from said first direction.

27. The method defined in claim 20 wherein said preliminary light pulse is of incoherent light energy.

28. The method defined in claim 19 wherein said light pulses are of incoherent light energy.

29. The method defined in claim 19 wherein said light-limiting optical material is in protective eyewear.

30. The method defined in claim 19 wherein the light-limiting reaction of said optical material has a predetermined delay or lag time from an initial reception of said trigger signal by said sensor to a point where the material is sufficient darkened to effectively block light transmission, said trigger signal being generated and transmitted prior to said light pulses by a time at least equal to said delay or lag time.

31. The method defined in claim 19 wherein said sensor is said light-limiting optical material.

32. The method defined in claim 19 wherein said sensor is different from said light-limiting optical material, said sensor being operatively connected to said light-limiting optical material for acting on said light-limiting optical material to darken the same.